

Proposed Wireless Telecommunications Facility

CT-3605B
160 West Street
Cromwell, Connecticut

Prepared for **NEXTEL Communications**
 100 Corporate Place
 Rocky Hill, CT 06067

Prepared by **VHB/Vanasse Hangen Brustlin, Inc.**
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 Middletown, CT 06457

May 2006

Visual Resource Evaluation

NEXTEL Communications seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need to construct a telecommunications Facility to be located within the Town of Cromwell, Connecticut. This "Visual Resource Evaluation" was conducted to approximate the visibility of the proposed Facility within a two-mile radius of the Site (Study Area).

Project Introduction

The proposed Facility includes the construction of an 80-foot tall stealth flagpole and associated ground equipment to be located within a fenced enclosure at the base of the tower. The flagpole will be partially constructed of a radio frequency transparent material within which the proposed antenna panels will be encased. Based on information provided by the project engineer, URS Corporation, the proposed project area is located at approximately 132 feet Above Mean Sea Level (AMSL). Access to the proposed Facility will be provided via the existing parking area located on the host property.

Site Description and Setting

The proposed Facility is situated on property located at 160 West Street (host property) within the Town of Cromwell, Connecticut. The host property is zoned BUS (Business District) and consists of approximately 4.5 acres of land and is identified in the Town of Cromwell land records as Map 31/Block 17/Lot #14A (see Photolog Documentation map contained in Attachment A). The host property is currently occupied by three single-story office buildings and associated parking areas. The proposed Facility is located on the northwest corner of the host property adjacent to a wooded buffer that currently exists between the north and west sides of the lot and several adjoining residential properties. Land use within the general vicinity of the proposed Facility is comprised of medium-density residential parcels, the commercial buildings located on the host property and highway infrastructure. Larger commercial and retail land uses are located along Route 372 and Route 3 west of the host property. Portions of Interstate 91 and Route 9, a limited access highway, are contained within the Study Area. Other state numbered roadways located within the limits of the Study Area include Route 3, Route 372 and Route 99. In total, the Study Area contains roughly 105 linear miles of paved roadways.

The topography in the Study Area is generally characterized by gently rolling hills that range in ground elevation from approximately 8 feet AMSL to approximately 288 feet AMSL. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species. The tree canopy occupies approximately 3,020 acres of the 8,042-acre study area (38%). During the in-field activities associated with this analysis, an infrared laser range finder was used to accurately determine the average tree canopy height throughout the Study Area. Numerous

trees were selected for measurement and the average tree canopy established, in this case 50 feet. The Study Area also contains large tidal marsh areas associated with the Connecticut and Mattabesset Rivers. In total, the Study Area features approximately 270 acres of surface water.

METHODOLOGY

To estimate the visibility associated with the proposed Facility, VHB has incorporated a two-fold approach utilizing both a predictive computer model and in-field analysis. The predictive model is employed to assess potential visibility throughout the entire Study Area, including private property and/or otherwise inaccessible areas for field verification. A "balloon float" and Study Area drive-through reconnaissance are also conducted to obtain locational and height representations, back check the initial computer model results and provide photographic documentation from publicly accessible areas. Results of both activities are analyzed and incorporated into the final viewshed map. A description of the methodologies used in the analysis is provided below.

Visibility Analysis

Using ESRI's ArcView® Spatial Analyst, a computer modeling tool, the areas from where the proposed Facility is expected to be visible are calculated. This is based on information entered into the computer model, including Facility height, its ground elevation, the surrounding topography, existing vegetation and any significant structures/objects that may act to obstruct potential views. Data incorporated in the model includes 7.5 minute digital elevation models (DEMs) and a digital forest layer for the Study Area. The DEMs were produced by the United States Geological Survey (USGS) in 1982 at a 30 meter resolution. The forest layer was derived through on-screen digitizing in ArcView® GIS from 2004 digital orthophotos with a 0.5 foot pixel resolution.

Once the data are entered, a series of constraints are applied to the computer model to achieve an estimate of where the Facility will be visible. Initially, only topography was used as a visual constraint; the tree canopy is omitted to evaluate all areas of potential visibility without any vegetative screening. Although this is an overly conservative prediction, the initial omission of these layers provides a reference for comparison once the tree canopy is established and also assists in the evaluation of potential seasonal visibility of the proposed Facility. A conservative tree canopy height of 50 feet is then used to prepare a preliminary viewshed map for use during the Study Area reconnaissance. The average height of the tree canopy is determined in the field using a hand-held infra-red laser range finder. The average tree canopy height is incorporated into the final viewshed map; in this case, 50 feet was identified as the average tree canopy height. The forested areas within the Study Area were then overlaid on the DEM with a height of 50 feet added and the visibility calculated. The

forested areas are then extracted from the areas of visibility, with the assumption that a person standing among the trees will not be able to view the Facility beyond a distance of approximately 500 feet. Depending on the density of the vegetation in these areas, it is assumed that some locations within this range will provide visibility of at least portions of the Facility based on where one is standing. Lastly, this analysis was conducted in 20-foot increments from 80 feet down to 20 feet and the results consolidated into a single thematic layer in order to determine the approximate amount of the tower structure that would be visible from any given location.

Also included on the map is a data layer, obtained from the Connecticut State Department of Environmental Protection (CTDEP), which depicts various land and water resources such as state parks and forests, recreational facilities, dedicated open space and CTDEP boat launches among other categories. This layer is useful in identifying potential visual impacts to any sensitive receptors that may be located within the Study Area. Lastly, based on a review of available data published by the Connecticut Department of Transportation and discussions with town staff in Cromwell and Middletown, it was determined that there are no state or locally designated scenic roadways contained within the Study Area.

A preliminary viewshed map is generated for use during the in-field activity in order to confirm that no significant land use changes have occurred since the 2004 aerial photographs used in this analysis were produced and to verify the results of the model in comparison to the balloon float. Information obtained during the reconnaissance is then incorporated into the final visibility map.

Balloon Float and Study Area Reconnaissance

On May 4, 2006 Vanasse Hangen Brustlin Inc., (VHB) conducted a balloon float at the proposed Facility in order to evaluate the potential viewshed within the Study Area. The balloon float consisted of raising and maintaining a tethered, helium filled weather balloon at the proposed Site location at a height of 80 feet. Once the balloon was aloft, VHB personnel drove the public road system in the study area to inventory those areas where the balloon was visible. During the balloon float, weather conditions were sunny. The temperature was approximately 70 degrees with calm winds.

Photographic Documentation

During the balloon float, VHB staff conducted a drive-by reconnaissance along the roads located within the Study Area with an emphasis on nearby residential areas and other potential sensitive receptors in order to evaluate and refine the results of the preliminary viewshed map and to verify where the balloon was, and was not, visible above and/or through the tree canopy. The balloon was photographed from a number of different vantage

points to document the actual view towards the proposed Facility. The locations and orientations of the photos are described below:

1. View from Highridge Drive adjacent to house #23, looking southwest.
2. View from Highridge Drive adjacent to house #6, looking southwest.
3. View from Patricia Lane Cul-de-Sac, looking southwest.
4. View from end of Arrowhead Drive, looking south.
5. View from West Street and Washington Street, looking northwest.
6. View from Hicksville Road south of West Street, looking northwest.
7. View from Route 372, looking northeast.
8. View from Route 3 north of Berlin Road, looking northeast.

Photographs of the balloon from the view points listed above were taken with a Nikon Digital Camera COOLPIX 5700, which has a lens focal length equivalent to a 35 mm camera with a 38 to 115 mm zoom. "The lens that most closely approximates the view of the unaided human eye is known as the normal focal-length lens. For the 35 mm camera format, which gives a 24x36 mm image, the normal focal length is about 50 mm." The optical zoom lens for the Nikon COOLPIX was set at a range of 50 mm to 70 mm for the purposes of this Visual Resource Evaluation.

The locations of the photographic points are recorded in the field using a hand held GPS receiver and are subsequently plotted on the maps contained in the attachments to this document.

Photographic Simulation

Photographic Simulations were generated for the eight locations identified above. The Photographic Simulations represent a scaled depiction of the proposed flagpole from these locations. The height of the Facility is determined based on the location of the balloon in the photographs and a proportional flagpole image is simulated into the photographs. The simulations are contained in Attachment B.



CONCLUSIONS

Based on this analysis, areas from where the proposed 80-foot flagpole would be visible above the tree canopy comprise approximately 112 acres, or just over one percent of the 8,042-acre Study Area. This includes an approximate 57-acre area of visibility over a tidal marsh located nearly 2.0 miles to the south of the proposed Facility and an approximate 16-acre area of visibility depicted over an open parking lot associated with a large shopping

¹ Warren, Bruce. *Photography*, West Publishing Company, Eagan, MN, c. 1993, (page 70).

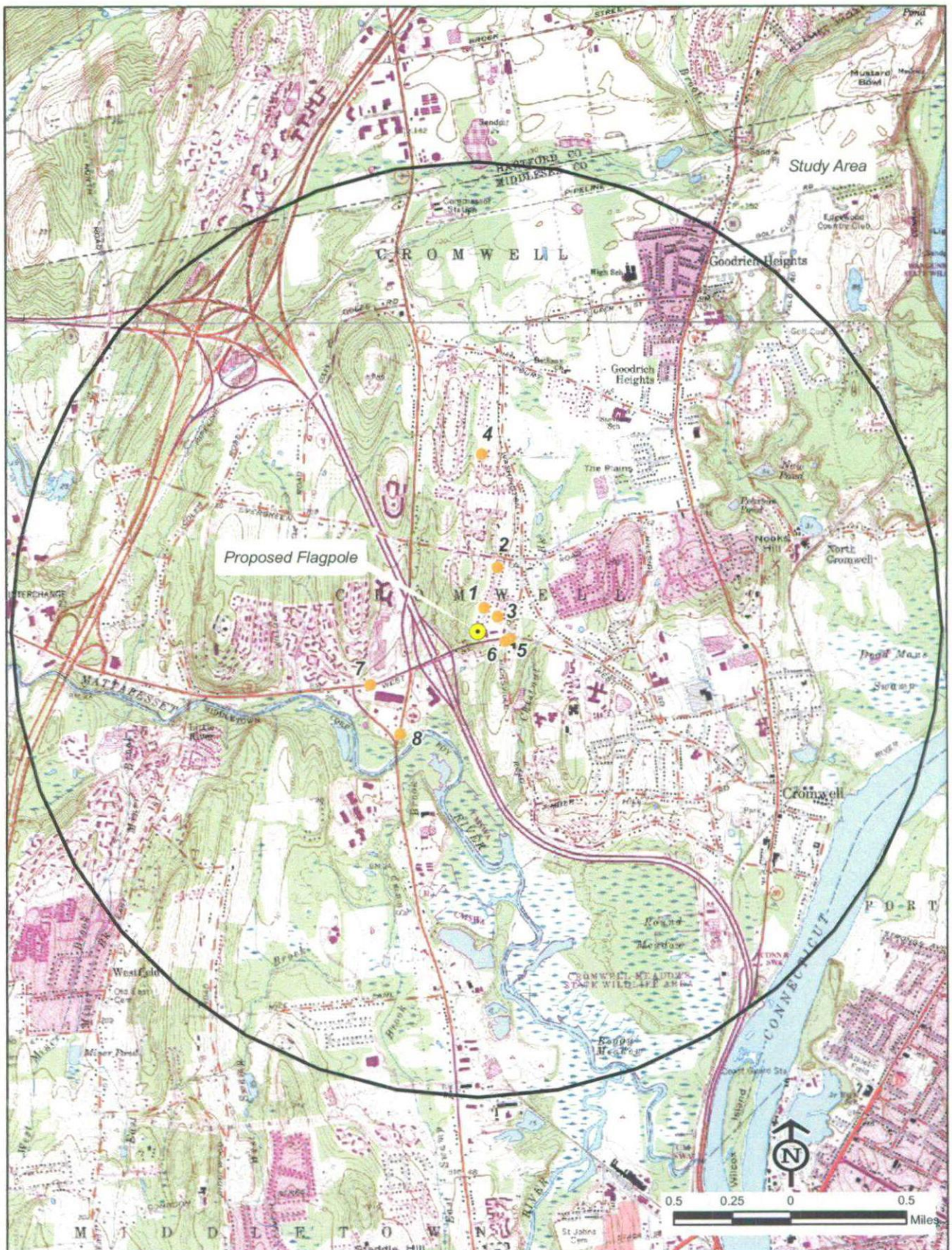
plaza located to the west. Other areas from where the proposed flagpole is expected to be visible are mainly located within the immediate vicinity of the proposed Facility along Highridge Drive, West Street, Washington Street and Hicksville Road. The viewshed map also depicts several additional areas of visibility located to the north of the proposed Facility along Arrowhead Drive and Route 3. VHB estimates that approximately 24 residences within the Study Area will have partial year round views of the proposed flagpole. These properties are located within nearby residential areas to the north of the proposed flagpole. Views from these areas will generally feature upper portions of the flagpole as is presented in the photographic documentation and simulations contained in this report. The existing landscaping (specimen trees and shrubbery) within the adjacent residential areas discussed above is sufficient to significantly minimize anticipated views. The design of the proposed Facility (an 80-foot tall flagpole) and its setting (an existing commercial property) will also serve to minimize potential visual impacts from within the Study Area. The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views through the trees are anticipated. These areas comprise approximately 15 additional acres and are mostly limited to the immediate vicinity of the proposed Facility along the periphery of anticipated areas of year-round visibility.

Attachment A

Photolog Documentation Map, Balloon Float Photographs and Photographic Simulations

Photolog Documentation

Town of
Cromwell
Connecticut



Photographic Documentation and Simulation View 1



CT-3605B

160 West Street
Cromwell, CT

Flagpole w/ flag

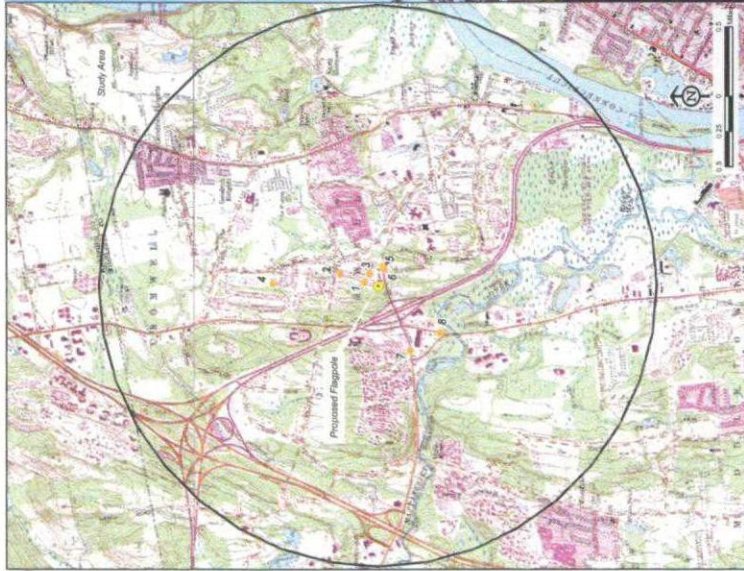


PHOTO TAKEN FROM HIGHRIDGE DRIVE ADJACENT TO HOUSE #23, LOOKING SOUTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.12 MILE +/-

NEXTEL

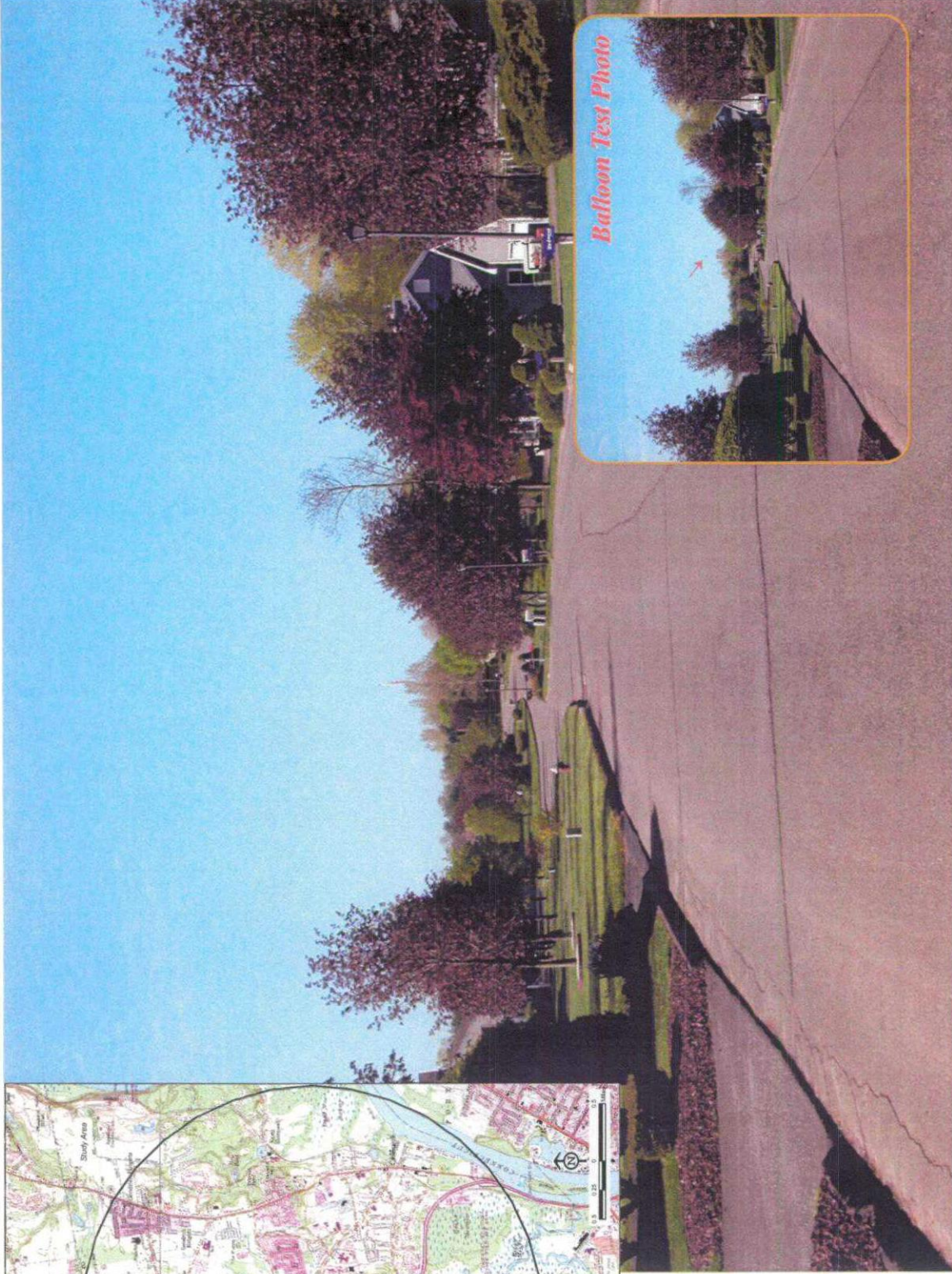
Vinasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation View 2



CT-3605B
160 West Street
Cromwell, CT

Flagpole w/ flag



Balloon Test Photo

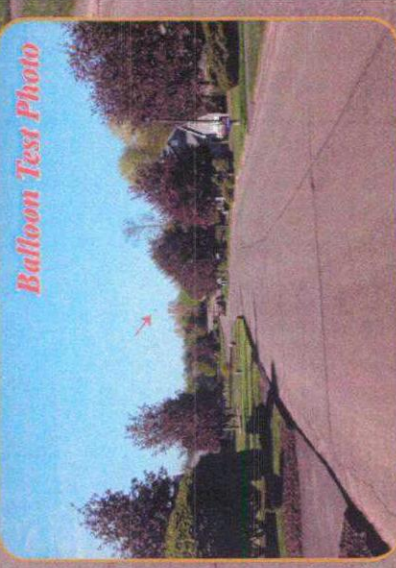
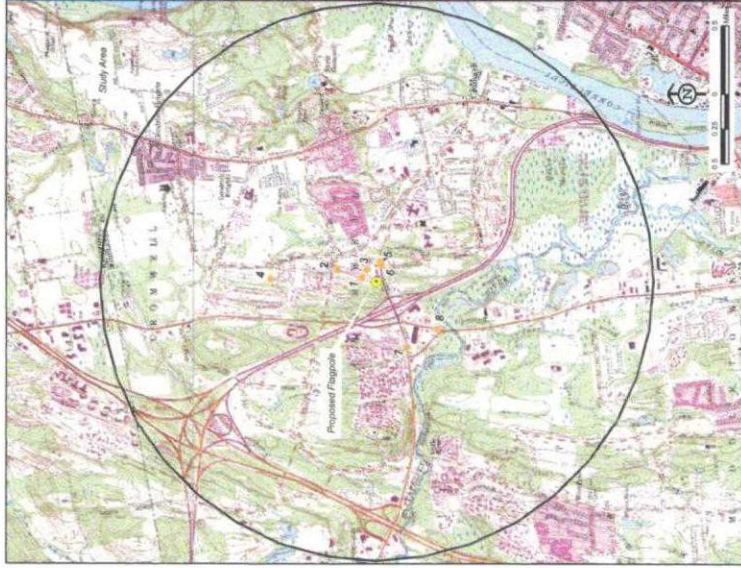


PHOTO TAKEN FROM HIGHRIDGE DRIVE ADJACENT TO HOUSE #6, LOOKING SOUTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.29 MILE +/-

Photographic Documentation and Simulation View 3

Town of
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CT-3605B
160 West Street
Cromwell, CT
Flagpole w/ flag

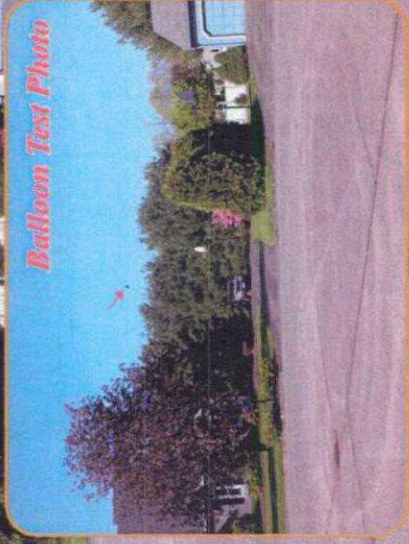
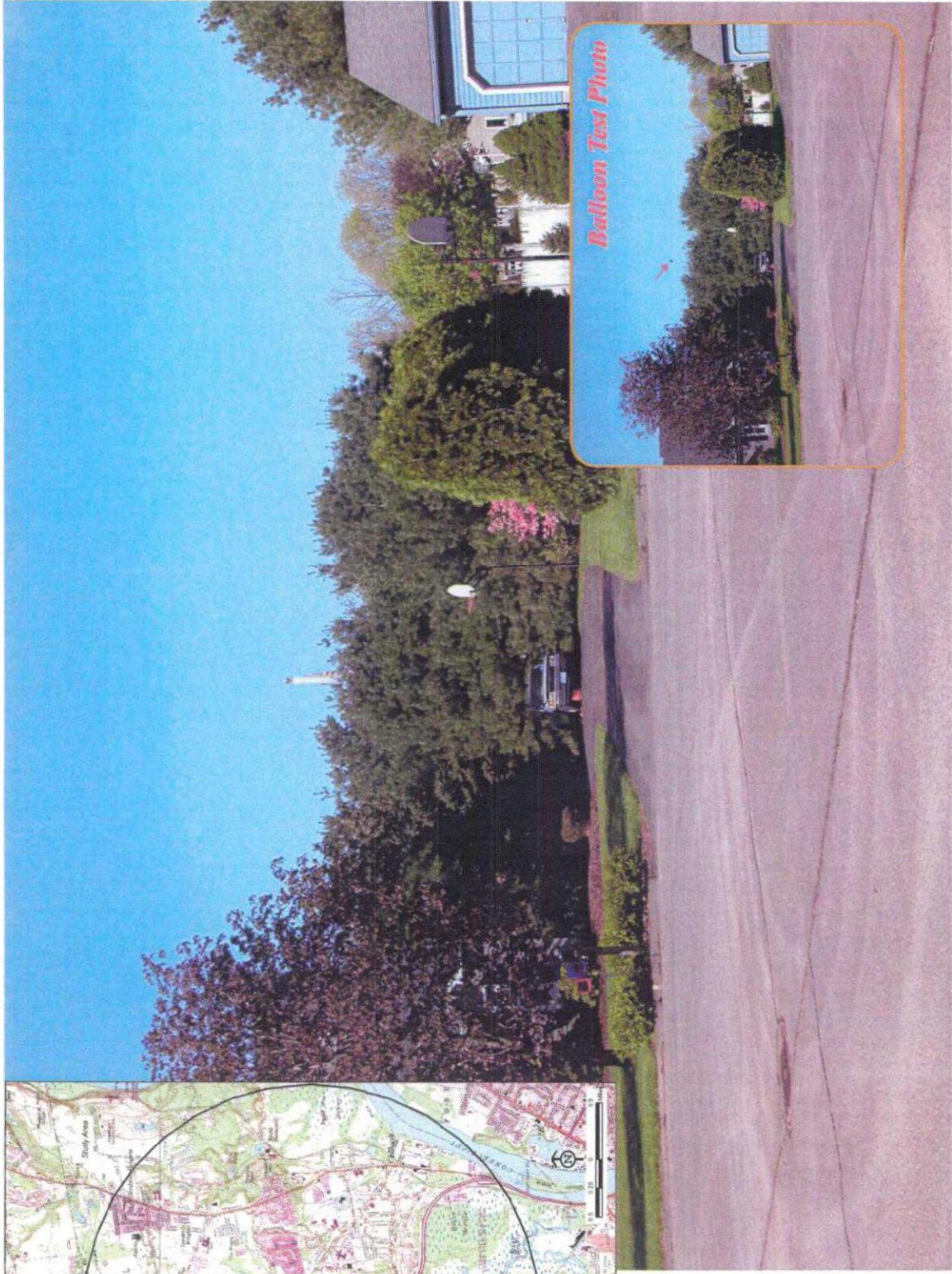


PHOTO TAKEN FROM PATRICIA LANE CUL-DE-SAC, LOOKING SOUTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.10 MILE +/-

Photographic Documentation and Simulation View 4



CT-3605B
160 West Street
Cromwell, CT

Flagpole w/ flag

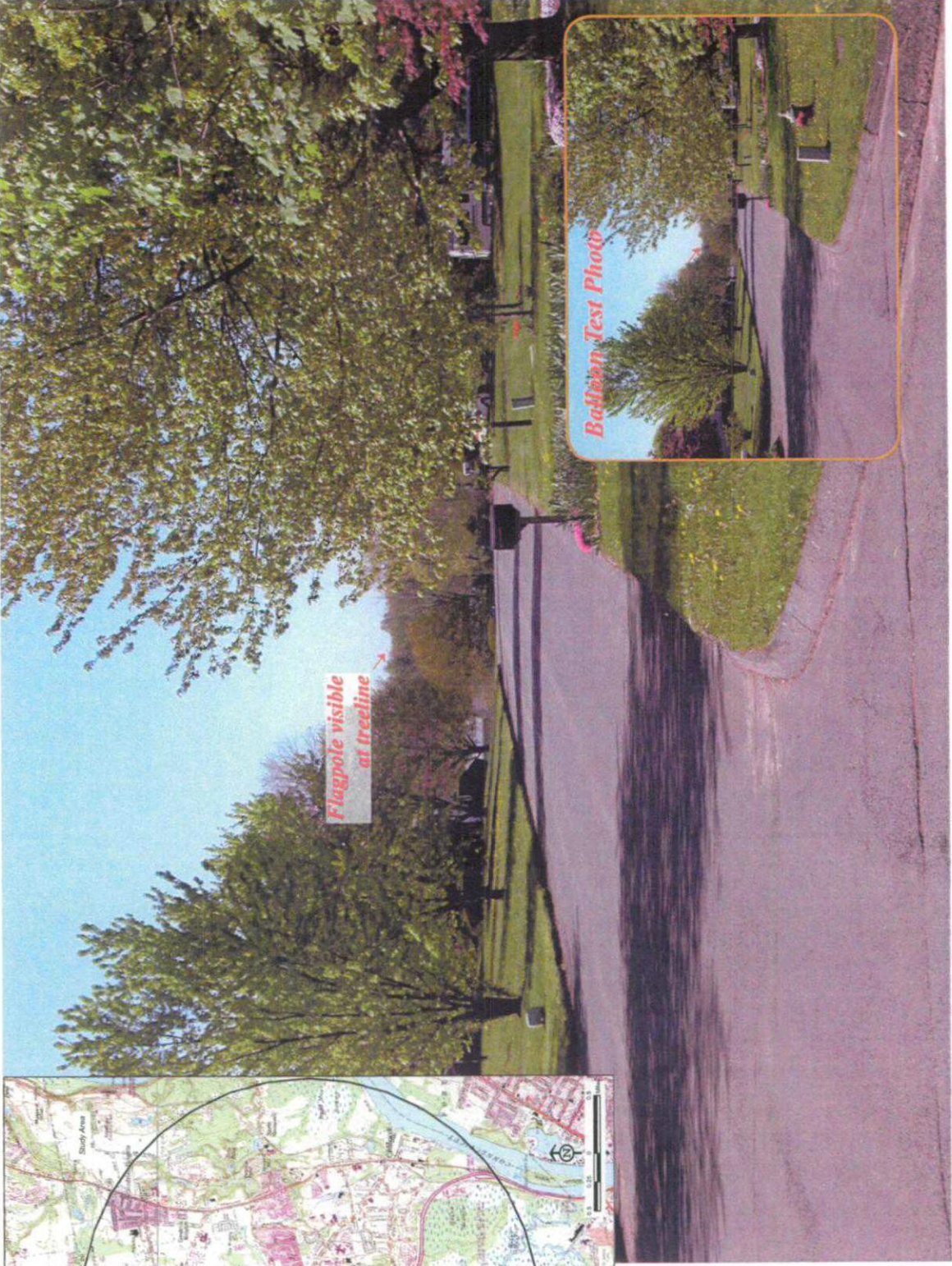
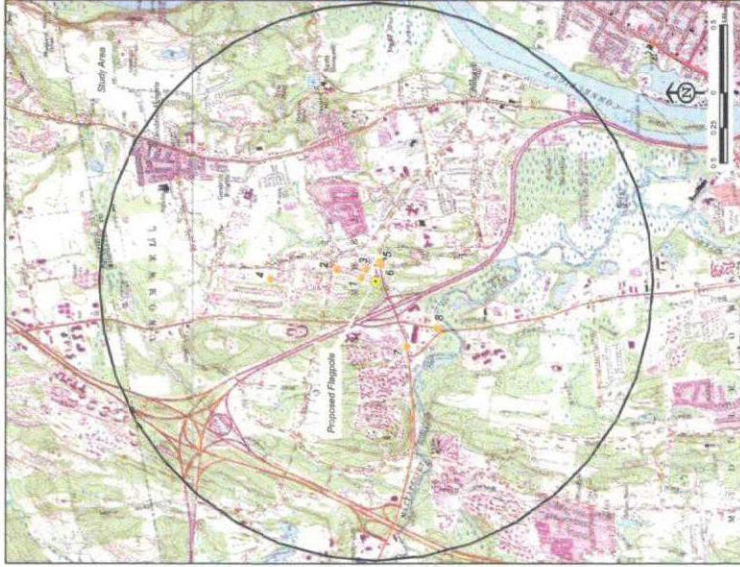


PHOTO TAKEN FROM END OF ARROWHEAD DRIVE, LOOKING SOUTH
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.75 MILE +/-

Photographic Documentation and Simulation View 5

Town of
Cromwell
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CT-3605B
160 West Street
Cromwell, CT
Flagpole w/ flag

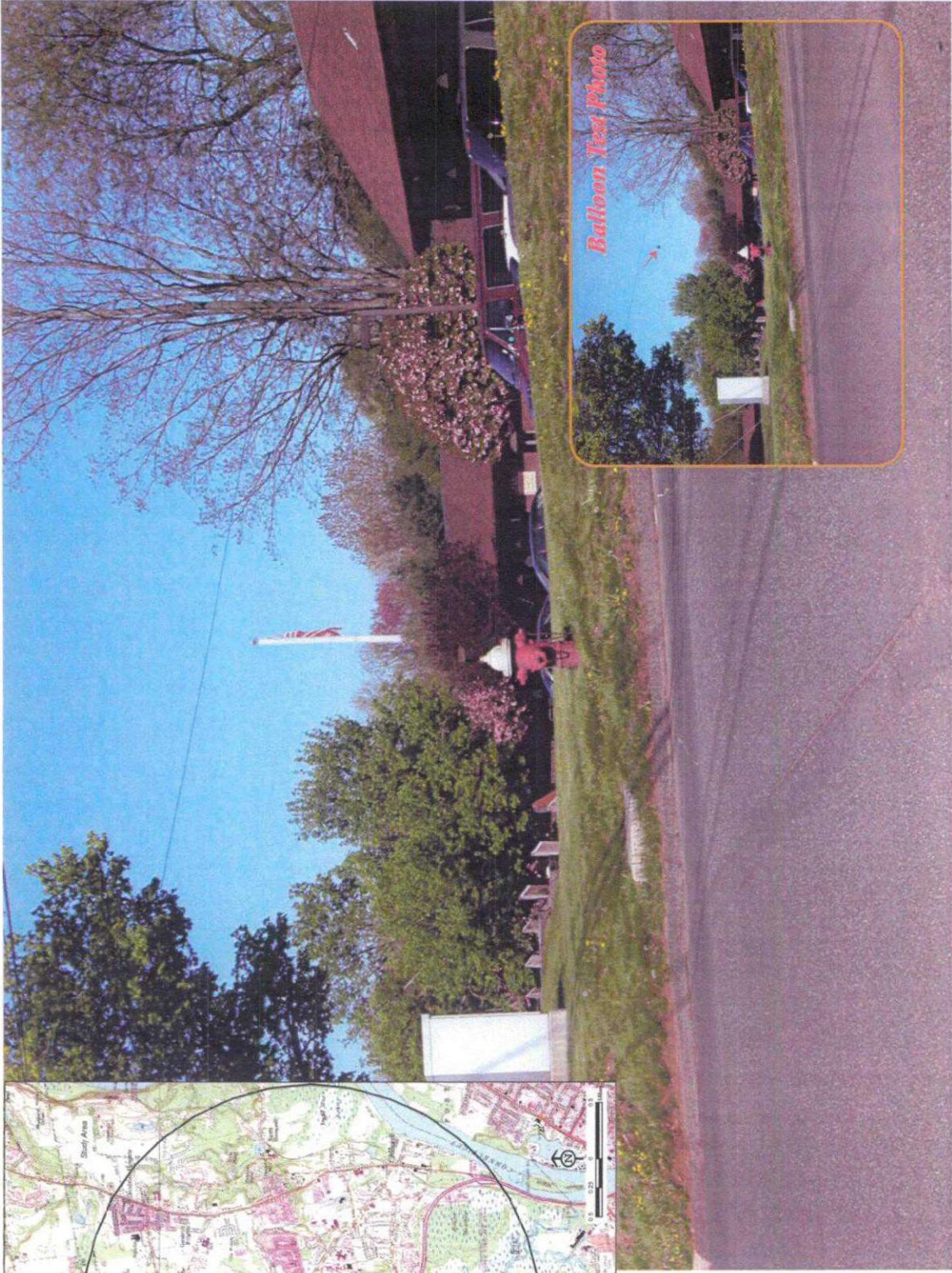


PHOTO TAKEN FROM WEST STREET AT WASHINGTON STREET, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.14 MILE +/-

Photographic Documentation and Simulation View 6



CT-3605B
160 West Street
Cromwell, CT

Flagpole w/ flag



PHOTO TAKEN FROM HICKSVILLE ROAD SOUTH OF WEST STREET, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.13 MILE +/-

Photographic Documentation and Simulation View 7



CT-3605B

160 West Street
Cromwell, CT

Flagpole w/ flag

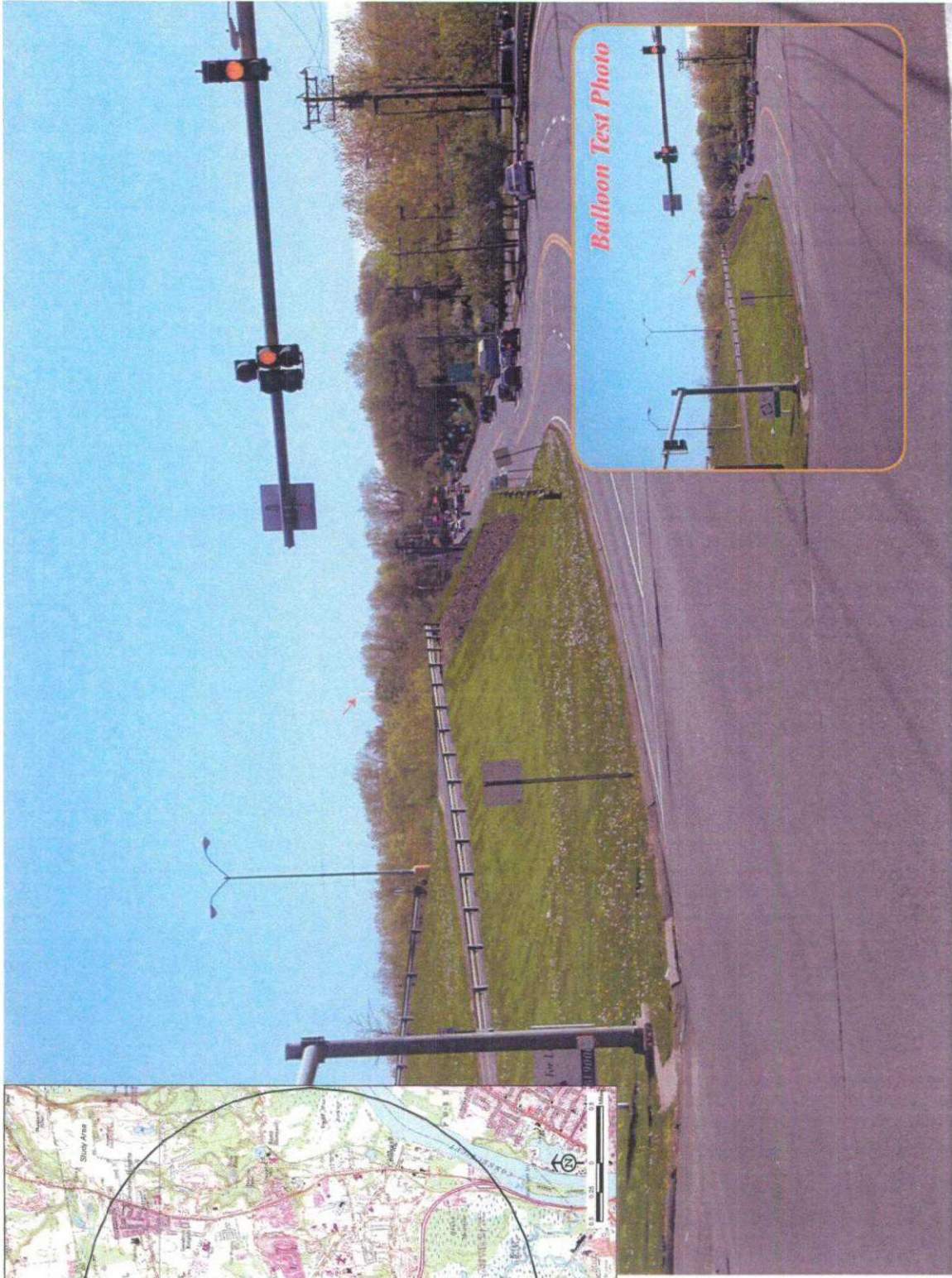


PHOTO TAKEN FROM ROUTE 372, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.51 MILE +/-

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Vincent Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation View 8



CT-3605B
160 West Street
Cromwell, CT

Flagpole w/ flag

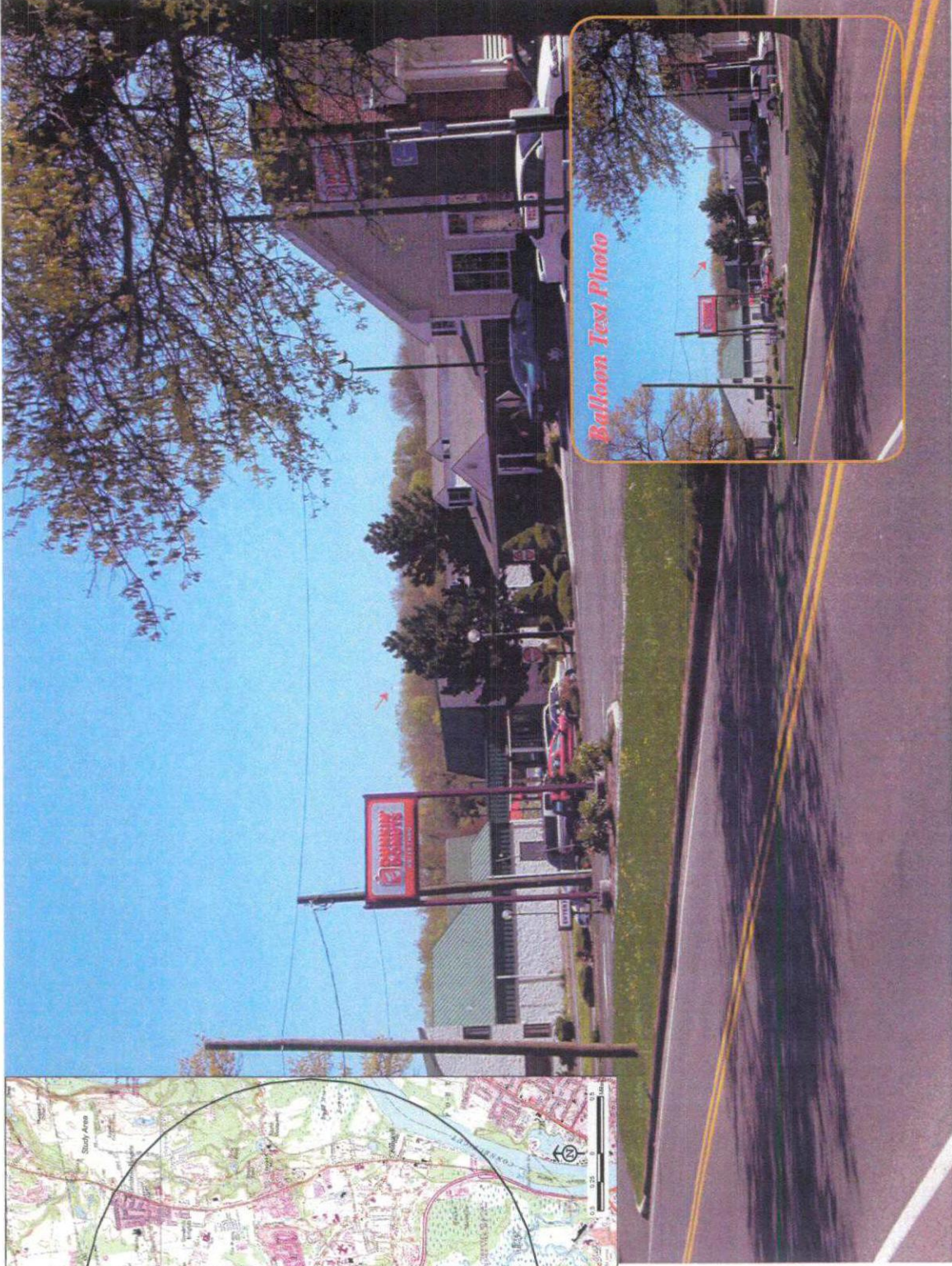
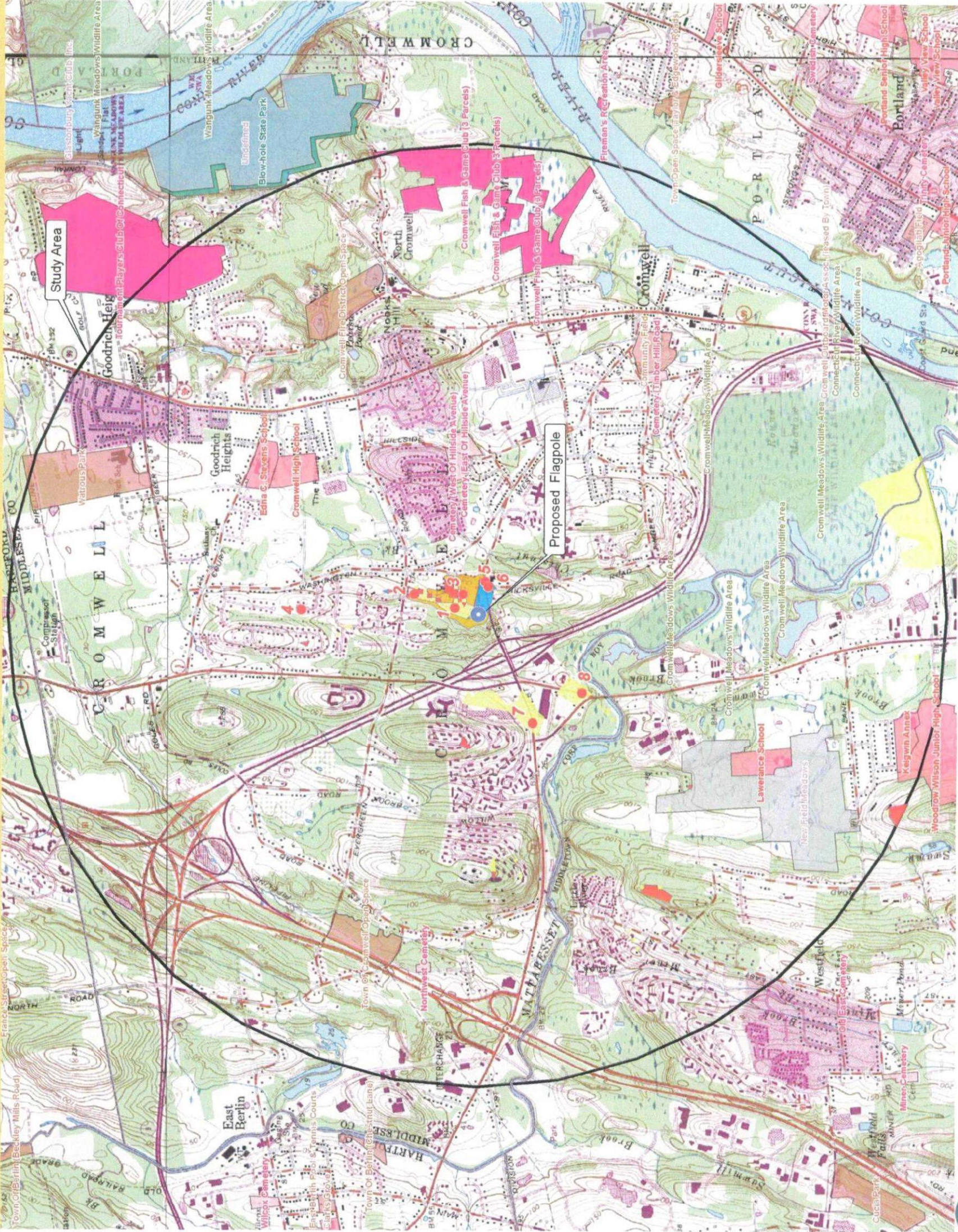


PHOTO TAKEN FROM ROUTE 3 NORTH OF BERLIN ROAD, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.56 MILE +/-

Attachment B

Viewshed Map



CT-3605B 160 West Street Cromwell, Connecticut

NOTE:

- Viewshed analysis conducted using ESRI's Spatial Analyst and observations made during balloon float.
- Proposed Facility height is 80 feet.
- Average tree canopy height estimated at 50 feet.

DATA SOURCES:

- 7.5 minute digital elevation model (DEM) with 30 meter resolution produced by the USGS, 1982
- Forest areas derived from 2004 digital orthophotos with 0.5-foot pixel resolution; digitized by VHB, 2006
- Base map comprised of Glastonbury, Hartford South, Middletown and Middle Haddam USGS Quadrangle Maps
- Coordinates of proposed Facility: Lat. 41 36 21.57 Long. 72 40 13.37
- Protected properties data layer provided CTDEP, 2003
- Scenic Roads layer derived from available State and Local listings.

Map Compiled May, 2006

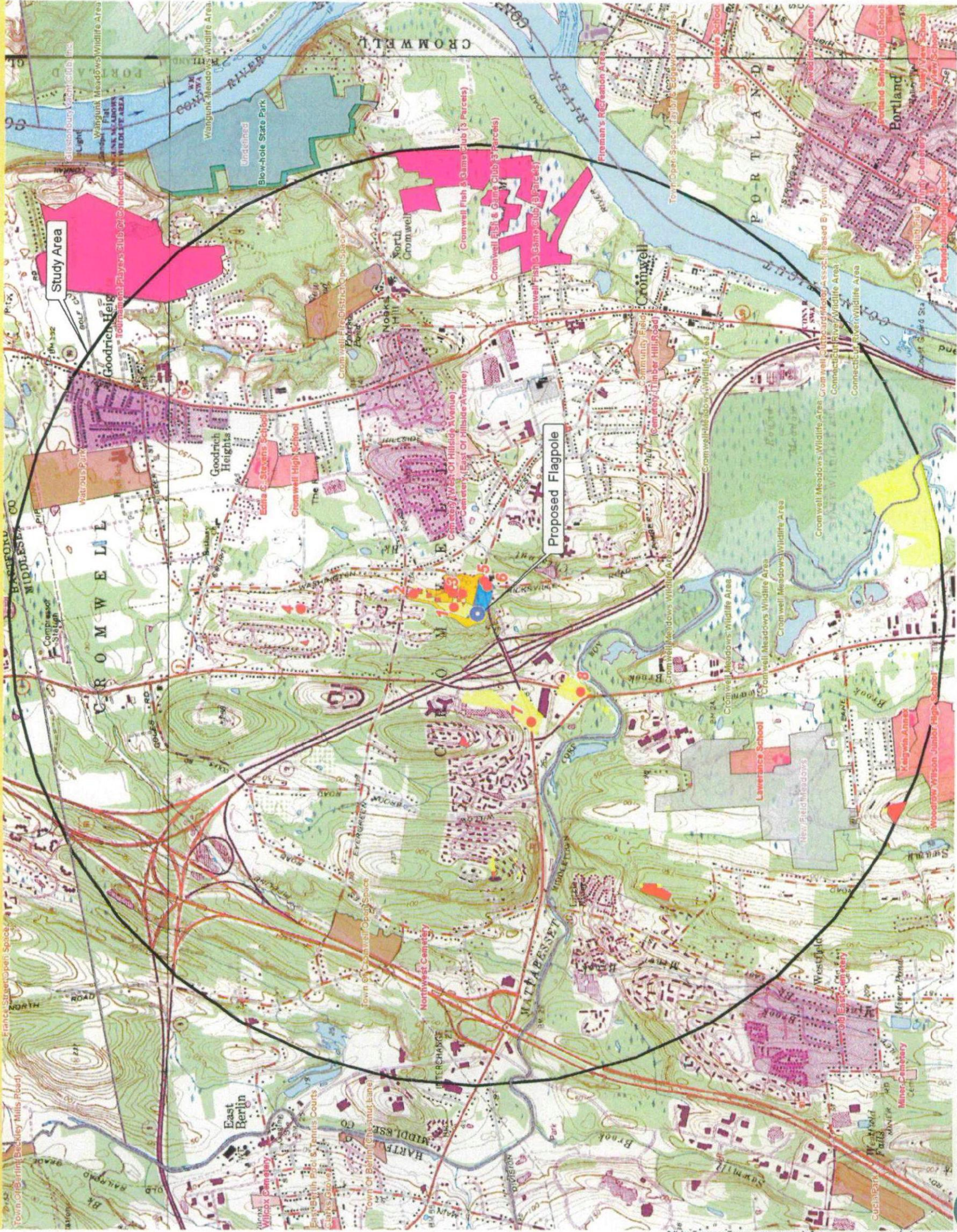
Legend

- Proposed Tower Location (Includes area of visibility approximately 500 feet around facility)
- Photos - May 4, 2006
- Balloon Visible Above Trees
- Seasonal Visibility (Approximately 15 acres)
- Protected Properties (Federal)
- Protected Properties (CT DEP)
- State Forest
- State Park
- DEP Owned Waterbody
- State Park Scenic Reserve
- Historic Preserve
- Natural Area Preserve
- Fish Hatchery
- Flood Control
- Other
- State Park Trail
- Water Access
- Wildlife Area
- Wildlife Sanctuary
- DEP Boat Launches
- Scenic Road (State and Local)
- Approximate Property Boundary
- Town Line
- Protected Properties (Municipal)
- Cemetery
- Preservation
- Conservation
- Existing Preserved Open Space
- Recreation
- General Recreation
- School
- Uncategorized
- Tree Line View - Upper 25% - 93 Acres
- 50% - 11 Acres
- 75% - 6 Acres
- Entire Facility - 2 Acres
- Year-Round Visibility is Approximately 112 Acres

Viewshed Map

Topography and Forest Cover as Constraints

Town of
Cromwell
Connecticut



CT-3605B
160 West Street
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NOTE:

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- Proposed Facility height is 80 feet.
- Average tree canopy height estimated at 50 feet.

DATA SOURCES:

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Map Compiled May, 2006

Legend

- Proposed Tower Location (Includes area of visibility approximately 500 feet around facility)
- Photos - May 4, 2006
- Balloon Visible Above Trees
- Seasonal Visibility (Approximately 15 acres)
- Approx. % of Flagpole Visible (Year-Round)
- Tree Line View - Upper 25% - 93 Acres
- 50% - 11 Acres
- 75% - 6 Acres
- Entire Facility - 2 Acres
- Year-Round Visibility is Approximately 112 Acres
- Protected Properties (Municipal)
- Cemetery
- Preservation
- Conservation
- Existing Preserved Open Space
- Recreation
- General Recreation
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- Protected Properties (Federal)
- Protected Properties (CT DEP)
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